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Analysis and Design of Breeding Management Information System in Poultry Farms

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Abstract

Breeding management is indispensable in business development in the field of poultry farming where companies are required to keep up with the development of the digitalization era. Companies must be able to take advantage of opportunities in advances in information technology in obtaining accurate, fast and reliable information so that management can make decisions. PT. Peternakan Ayam Manggis has been using manual methods in recording the results of production or the process of breeding chicken farms. in making records using office software, namely excel, so that errors often occur and are often not realtime in making records. Records generated by poultry production include depletion, quarantine, culling, feed and egg production. in processing data generated manually can make it difficult for management to make decisions. The purpose of this research is to design an application that can be used by companies to obtain information during the breeding process.The research method in developing this application uses waterfall and design role analysis with data collection and using UML modeling. This information system application produces information about Breeding management including depletion, quarantine, feed, egg production, movement of chickens from one cage to another, culling. this information system application uses a database and application blackbox testing is carried out so that the application runs as needed.

I. INTRODUCTION

The development of communication and information technology is very rapid in the era of industrial globalization where companies are required to keep up with current developments. computers with their capabilities become technology that can be used as a tool in an information system [1]. Information technology is an important part of an organization, which makes facilities able to realize efficiency in an operation and can achieve competitive quality [2].

Like companies in general, livestock companies are also required to have a competitive advantage over their competitors. PT. Peternakan Ayam Manggis is a company engaged in chicken farming located in Tenjo Ayu village, Cicurug District, Sukabumi Regency. In the process of filling in data from cages consisting of mortality (shrinkage), quarantine, vaccines, feed and eggs are still manual (use of Microsoft excel software) and in making reports is also still manual so that it becomes an obstacle to timeliness in decision making, and in making reports there are often errors so that reports are not accurate and repairs are often made. This is what makes reports made manually very doubtful in presenting data presentations. In making related reports needed in business processes, PT. Peternakan Ayam Manggis requires data per period of the previous year for breeding chicken livestock as a comparison for the current livestock. In making these reports, they still use a manual system (use of Microsoft excel software).

The purpose of this research intends to create a report system to improve the company's ability when technological developments are getting higher and the need for information in supporting decisions is also increasing, easy and fast so that it allows the management of the report system to produce various important information that has the potential to be utilized by company management. This system process is interconnected

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with one another so that it can produce accurate and reliable information [3]. "The system has an approach that emphasizes a network procedure that is interconnected, grouped and works together to achieve the desired goal" [4].

Accurate and reliable information can make the right decisions to advance the company's business [5]. The scope of this discussion is the production process of chicken population and feed, the production process of eggs produced by chicken livestock, the quarantine process of chicken livestock in case of problems.

II. METHODS

A. Information System

In this study, the design or modeling approach to making systems. A system can consist of subsystems. Each subsystem can consist of smaller sub-systems or consist of component components.

According to [3] “System is a collection of elements that are interrelated with each other and work together to achieve a goal of work together to achieve a goal of the system”.

According to [4] “The system has an approach that is emphasized in a procedure of interconnected networks, grouping and working together to achieve the desired goals”.

According to [5] “The system is a computer-based system that is intended to help decision makers by utilizing certain data and models”.

B. Data Collection Methodology

In this study, data collection techniques are a way to get as much information as possible and the most strategic step in research in making information systems [6]. The data collection steps for this research include:

a. Observation which requires direct observation of an object, field conditions, process or behavior [7].
b. Documents can be interpreted as written material published from the research site in order to obtain information or data that is easier to process.
c. Interviews which are indispensable in analyzing the process of observation or current manual documents.

C. Development of management information system

The process of developing information systems to support applications in this study requires an understanding of the basic concepts of information systems. The definition of a system in the field of information systems as "a group of interconnected components, working together to achieve a common goal by processing inputs and producing outputs in an orderly transformation process" [8].

According to [9], "Information systems are a combination of software, hardware, infrastructure and human resources (HR) that are interrelated to create a system that can process data into useful information."

D. Waterfall Methodology

Analysis and design of application development in this study using waterfall methodology. The Waterfall model is a process waterfall model that was first introduced, also called a life cycle model. The waterfall method is a method that emphasizes sequential and structured phases also known as the "classic life cycle", analysis, design, Coding, Testing, Implementation [10]. This method requires data that has been analyzed so that it can be done to create a clear information system. the following uses the framework in this study.

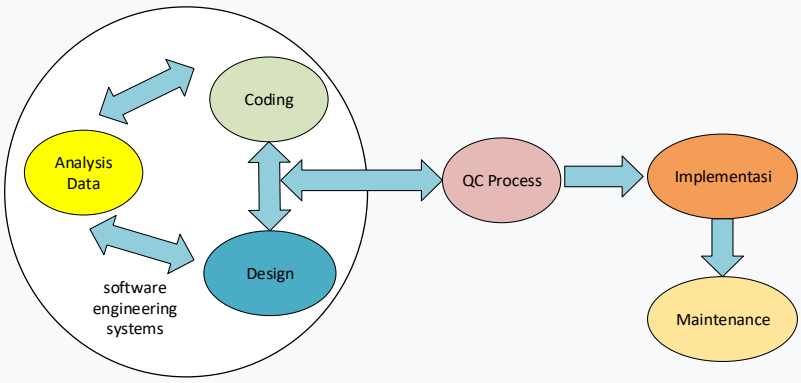


Fig. 1 Framework

The results of data analysis are used to create designs and coding, followed by the QC Process, where the QC Process is tasked with evaluating designs and coding that must be adjusted to the data analysis needed by the company. For the next stage is the implementation stage where the QC Process has run well and can be accounted for from this stage. This QC Process stage determines the level of success in the Analysis And Design Of Breeding Management Information System In Poultry Farms with waterfall methodology. The last stage of this process is

maintenance where after the implementation process, if there are changes in the implementation, the design and coding can change at least not changing the core of what has been determined during data analysis as needed.

E. Selective Breeding

The process of making information system applications in this study requires production data. The process of production data includes Selective breeding. selective action to separate or reduce the number of chickens in a chicken population based on certain criteria. Selective breeding management affects the information received. "Selective breeding is the only way to improve a chicken flock: this type of breeding demands the culling of all chickens that do not conform to breeding standards. Every breeder has standards; if not, then they are multipliers and not breeders"[11].

F. Farmer Behavior

The breeding process must use the poultry livestock standards set by the company. The standards in this study use COBB breeding management [12] in running Boiler Chicken livestock so as to produce egg production and good day of chick (DOC).

G. Database

In this research using sql server database. Sql Server is one of the RDBM (Relation Database Management System). RDBMS is a database system that stores data in the form of tables that are related to each other [13]**.**

H. UML (Unifield Modeling Language)

UML is a system analysis and design model that was created to facilitate application system makers. In UML there are fourteen types of diagrams used for software modeling, namely *Use Case diagram, Class diagram, Activity diagram* and *Sequence diagram* [14].

I. Blackbox Testing

This type of testing in this study uses Blackbox testing which treats software whose internal performance is unknown. This "black box" testing is very useful in software development, this tester does not need to see everything but only needs to see validation which is very important to support this application [15].

III. RESULTS

A. *Activity Diagram*

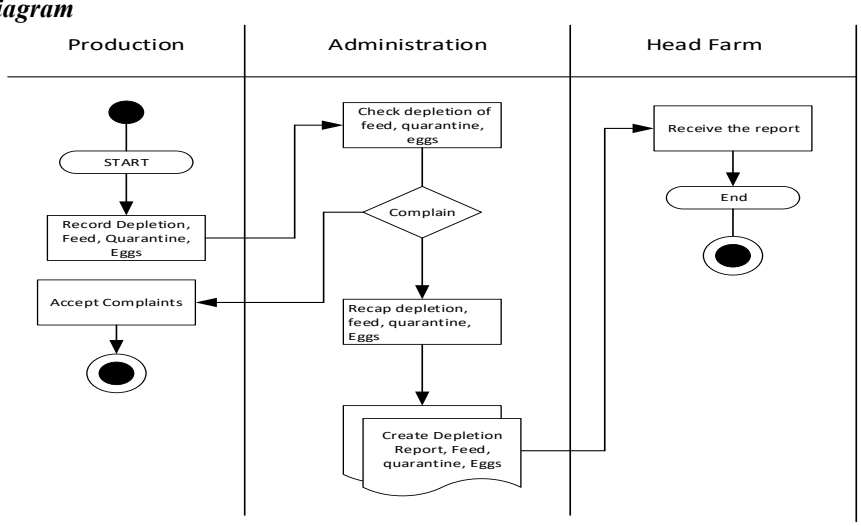


Fig. 2 *Activity Diagram* Breeding Boiler

This activity diagram is the workflow process of the running system.

B. *Use Case*

Use case diagrams describe the functionality of the system from the user's point of view. Used to describe the relationship between internal systems and external systems or the relationship between systems and actors. This use case diagram is used to find out what is in the system and who has the right (user authorization) to use these functions.

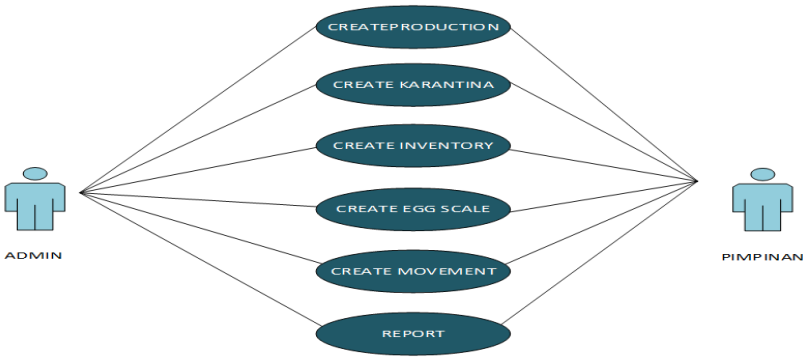


Fig 3. *Use Case* Diagram Adm

C. Database System

In designing a data-based computerized system is designing a system whose data is stored in accordance with the analysis and design of the system.

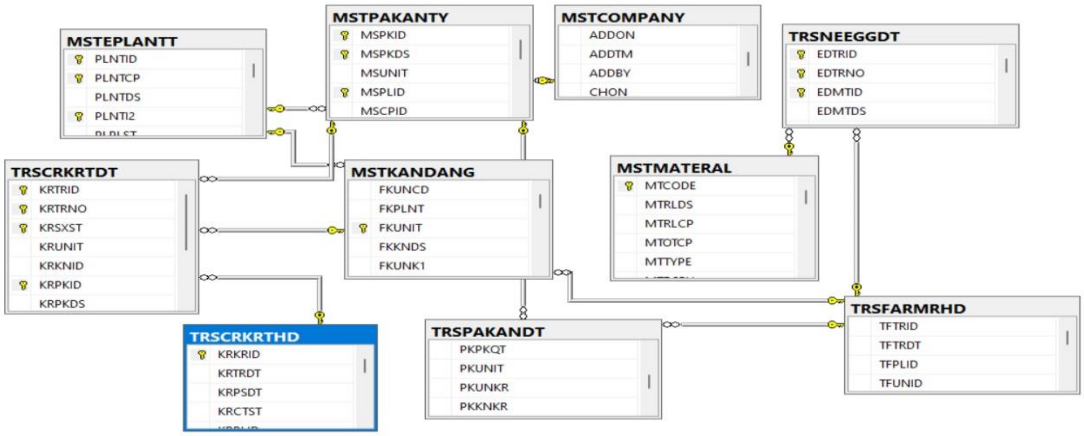


Fig. 4 Database System Design

D. *Sequence Diagram* Create Production

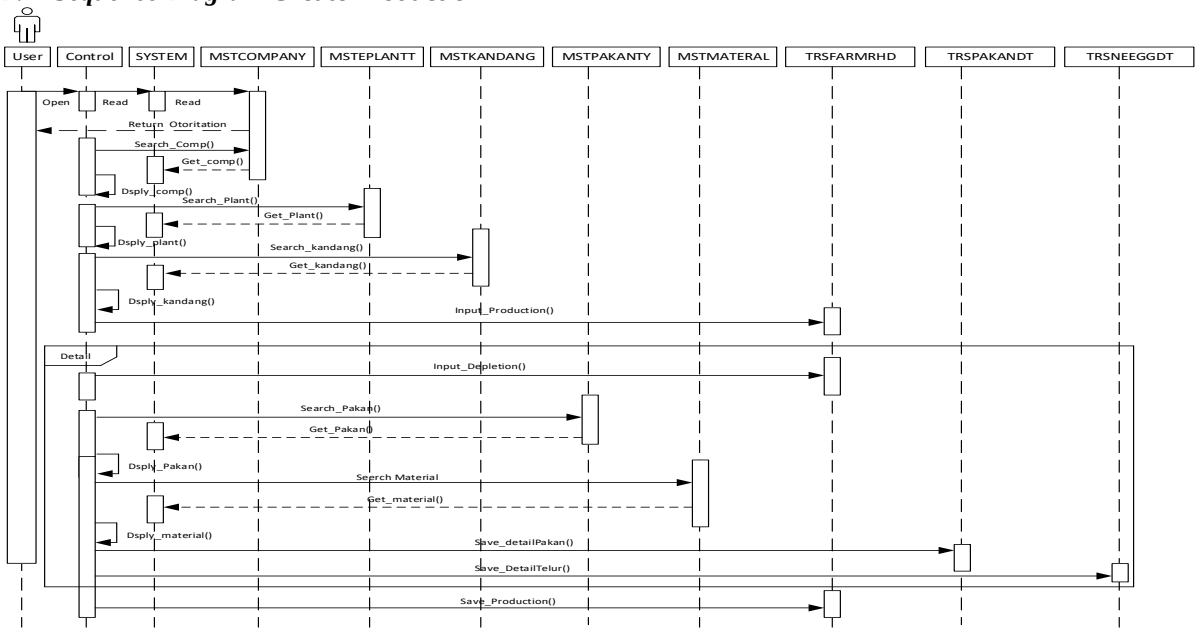


Fig. 5 *Sequence Diagram* Create Production

This create production sequence diagram illustrates the flow of activity in livestock production that allows user users to input livestock production data. Production input is based on cage data consisting of depletion, feed and eggs. For this egg production there is a time depending on the strain of broilers which is calculated from the age of the broiler week.

E. Production Create Design

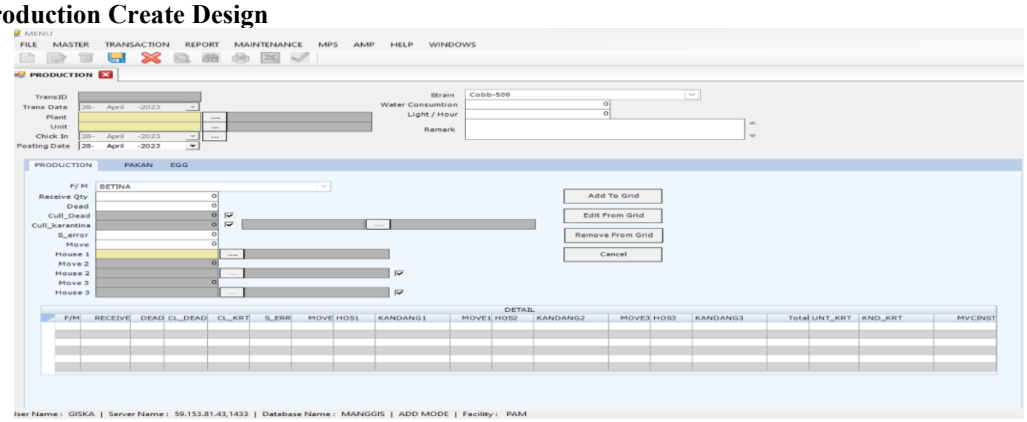


Fig. 6 Production Create Sub Depletion Display

This production display explains the process of inputting plant data, the corresponding cage and depletion including quarantine cull from the corresponding cage.

F. Create Feed Sub Production

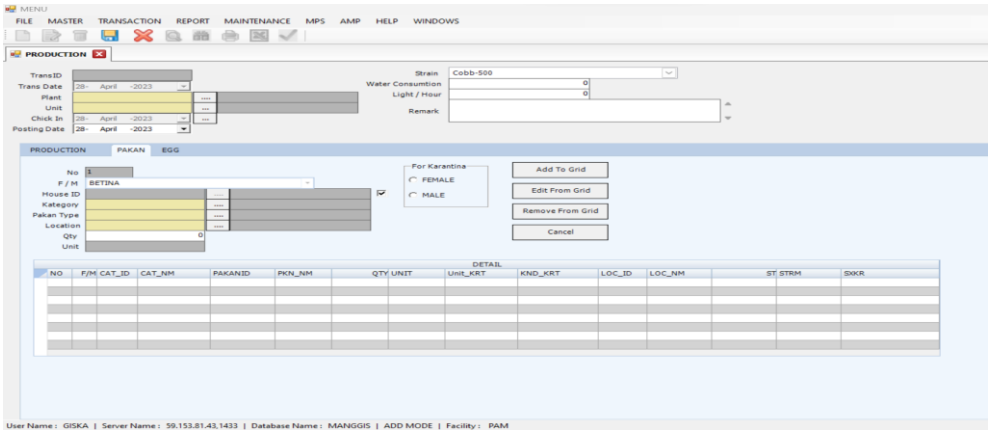


Fig. 7 Create Feed Sub Production Display

This production display explains the process of inputting feed data according to the sex of the chicken and the phase period of the chicken period.

G. Create Egg Sub Production

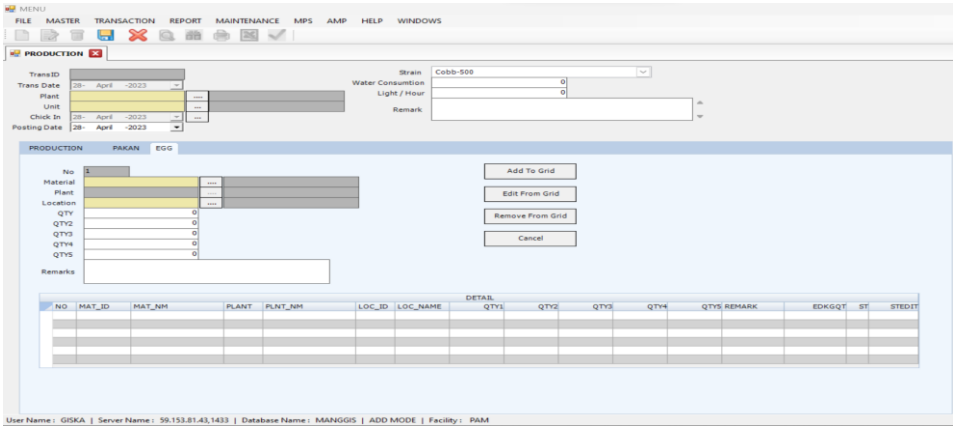
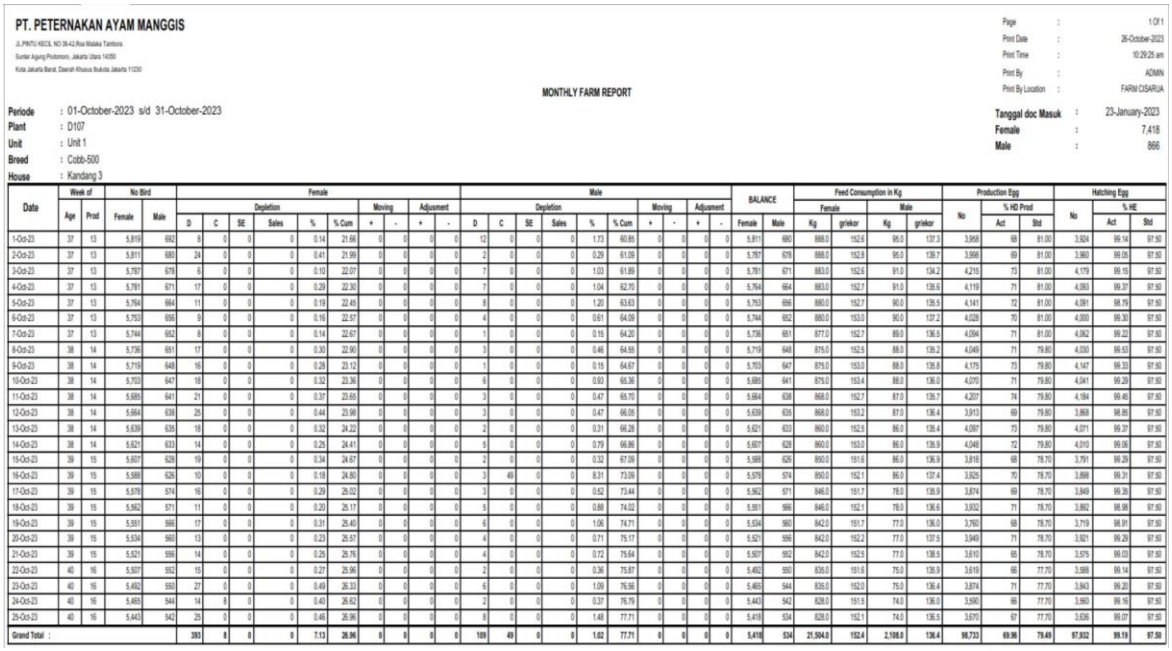


Fig. 8 Create Egg Sub Production Display

On the create egg scale display, input data on taking eggs for culling or selling, before being culled, the eggs are weight. For this egg only process CE eggs (Consumption Egg).

H. Result Report Monthly Production

The results of the report from the implementation are tested to get a realtime report, so that company management can read the required reports available on the system without having to ask the relevant department or user.



PT. PETERNAKAN AYAM MANGGIS

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MONTHLY FARM REPORT

Page : 1 Of 1
Print Date : 26-October-2023
Print Time : 10:29:25 am
Print By : ADMIN
Print By Location : FARM CISARUA

Periode : 01-October-2023 s/d 31-October-2023
Plant : D107
Unit : Unit 1
Breed : Cobb-500
House : Kandang 3

Tanggal doc Masuk : 23-January-2023
Female : 7,418
Male : 866

Date	Week of		No Bird		Female										Male										BALANCE		Feed Consumption in Kg				Production Eggs				Hatching Eggs			
					Depletion						Moving		Adjusment		Depletion						Moving		Adjusment				Female		Male				% HD Prod			% HE		
	Age	Prod	Female	Male	D	C	SE	Sales	%	% Cum	+	-	+	-	D	C	SE	Sales	%	% Cum	+	-	+	-	Female	Male	Kg	gr/ekor	Kg	gr/ekor	No	Act	Std	No	Act	Std
1-Oct-23	37	13	5,819	692	0	0	0	0	0.14	21.66	0	0	0	0	12	0	0	0	1.73	60.85	0	0	0	0	5,811	680	888.0	152.6	96.0	137.3	3,968	68	81.00	3,924	99.14	97.50
2-Oct-23	37	13	5,811	680	24	0	0	0	0.41	21.99	0	0	0	0	2	0	0	0	0.29	61.09	0	0	0	0	5,787	678	888.0	152.9	96.0	139.7	3,968	69	81.00	3,960	99.05	97.50
3-Oct-23	37	13	5,787	678	6	0	0	0	0.10	22.07	0	0	0	0	7	0	0	0	1.03	61.89	0	0	0	0	5,781	671	883.0	152.5	91.0	134.2	4,215	73	81.00	4,179	99.15	97.50
4-Oct-23	37	13	5,781	671	17	0	0	0	0.29	22.36	0	0	0	0	7	0	0	0	1.04	62.70	0	0	0	0	5,764	664	883.0	152.7	91.0	136.6	4,119	71	81.00	4,093	99.37	97.50
5-Oct-23	37	13	5,764	664	11	0	0	0	0.19	22.45	0	0	0	0	8	0	0	0	1.20	63.63	0	0	0	0	5,753	656	880.0	152.7	90.0	136.5	4,141	72	81.00	4,091	98.76	97.50
6-Oct-23	37	13	5,753	656	9	0	0	0	0.16	22.57	0	0	0	0	4	0	0	0	0.61	64.09	0	0	0	0	5,744	652	880.0	153.0	90.0	137.2	4,028	70	81.00	4,000	99.30	97.50
7-Oct-23	37	13	5,744	652	8	0	0	0	0.14	22.67	0	0	0	0	1	0	0	0	0.15	64.20	0	0	0	0	5,736	651	877.0	152.7	89.0	136.5	4,094	71	81.00	4,062	99.22	97.50
8-Oct-23	38	14	5,736	651	17	0	0	0	0.30	22.90	0	0	0	0	3	0	0	0	0.46	64.55	0	0	0	0	5,719	648	875.0	152.5	88.0	136.2	4,049	71	79.80	4,030	99.53	97.50
9-Oct-23	38	14	5,719	648	16	0	0	0	0.28	23.12	0	0	0	0	1	0	0	0	0.15	64.67	0	0	0	0	5,703	647	875.0	153.0	88.0	136.8	4,175	73	79.80	4,147	99.33	97.50
10-Oct-23	38	14	5,703	647	18	0	0	0	0.32	23.36	0	0	0	0	4	0	0	0	0.93	65.36	0	0	0	0	5,685	641	875.0	153.4	88.0	136.0	4,070	71	79.80	4,041	99.29	97.50
11-Oct-23	38	14	5,685	641	21	0	0	0	0.37	23.65	0	0	0	0	3	0	0	0	0.47	65.70	0	0	0	0	5,664	638	868.0	152.7	87.0	136.7	4,207	74	79.80	4,184	99.45	97.50
12-Oct-23	38	14	5,664	638	25	0	0	0	0.44	23.98	0	0	0	0	3	0	0	0	0.47	66.09	0	0	0	0	5,639	635	868.0	153.2	87.0	136.4	3,913	69	79.80	3,868	98.86	97.50
13-Oct-23	38	14	5,639	635	18	0	0	0	0.32	24.22	0	0	0	0	2	0	0	0	0.31	66.28	0	0	0	0	5,621	633	860.0	152.5	86.0	136.4	4,097	73	79.80	4,071	99.37	97.50
14-Oct-23	38	14	5,621	633	14	0	0	0	0.25	24.41	0	0	0	0	5	0	0	0	0.79	66.86	0	0	0	0	5,607	628	860.0	153.0	86.0	136.9	4,048	72	79.80	4,010	99.06	97.50
15-Oct-23	39	15	5,607	628	19	0	0	0	0.34	24.67	0	0	0	0	2	0	0	0	0.32	67.09	0	0	0	0	5,588	626	850.0	151.6	86.0	136.9	3,818	68	78.70	3,791	99.29	97.50
16-Oct-23	39	15	5,588	626	10	0	0	0	0.18	24.80	0	0	0	0	3	49	0	0	8.31	73.09	0	0	0	0	5,579	574	850.0	152.1	86.0	137.4	3,925	70	78.70	3,898	99.31	97.50
17-Oct-23	39	15	5,579	574	16	0	0	0	0.29	25.02	0	0	0	0	3	0	0	0	0.62	73.44	0	0	0	0	5,562	571	846.0	151.7	76.0	136.9	3,874	69	78.70	3,849	99.36	97.50
18-Oct-23	39	15	5,562	571	11	0	0	0	0.20	25.17	0	0	0	0	5	0	0	0	0.88	74.02	0	0	0	0	5,551	566	846.0	152.1	76.0	136.6	3,932	71	78.70	3,892	98.98	97.50
19-Oct-23	39	15	5,551	566	17	0	0	0	0.31	25.40	0	0	0	0	6	0	0	0	1.06	74.71	0	0	0	0	5,534	560	842.0	151.7	77.0	136.0	3,760	68	78.70	3,719	98.91	97.50
20-Oct-23	39	15	5,534	560	13	0	0	0	0.23	25.57	0	0	0	0	4	0	0	0	0.71	75.17	0	0	0	0	5,521	556	842.0	152.2	77.0	137.5	3,949	71	78.70	3,921	99.29	97.50
21-Oct-23	39	15	5,521	556	14	0	0	0	0.25	25.75	0	0	0	0	4	0	0	0	0.72	75.64	0	0	0	0	5,507	552	842.0	152.5	77.0	138.5	3,610	65	78.70	3,575	99.03	97.50
22-Oct-23	40	16	5,507	552	15	0	0	0	0.27	25.96	0	0	0	0	2	0	0	0	0.36	75.87	0	0	0	0	5,492	550	835.0	151.6	75.0	136.9	3,619	66	77.70	3,588	99.14	97.50
23-Oct-23	40	16	5,492	550	27	0	0	0	0.49	26.33	0	0	0	0	6	0	0	0	1.09	76.56	0	0	0	0	5,465	544	835.0	152.0	75.0	136.4	3,874	71	77.70	3,843	99.20	97.50
24-Oct-23	40	16	5,465	544	14	8	0	0	0.40	26.62	0	0	0	0	2	0	0	0	0.37	76.79	0	0	0	0	5,443	542	828.0	151.5	74.0	136.0	3,590	66	77.70	3,560	99.16	97.50
25-Oct-23	40	16	5,443	542	25	0	0	0	0.46	26.96	0	0	0	0	8	0	0	0	1.48	77.71	0	0	0	0	5,418	534	828.0	152.1	74.0	136.5	3,670	67	77.70	3,636	99.07	97.50
Grand Total :					393	8	0	0	7.13	26.96	0	0	0	0	109	49	0	0	1.02	77.71	0	0	0	0	5,418	534	21,504.0	152.4	2,106.0	136.4	98,733	69.96	79.49	97,932	99.19	97.50

Fig. 9 Report Monthly Production

This monthly report is taken from various system processes that integrate with each other, so that the reports generated from this system are faster than using manuals (Microsoft Excel). the monthly report presented explains the process of breeding livestock in accordance with Cobb management standards.

I. Flock Summary

The flock summary of the system implementation below is sourced from all daily, weekly inputs so as to form a breeding management graph to find out the breeding process in each plant.

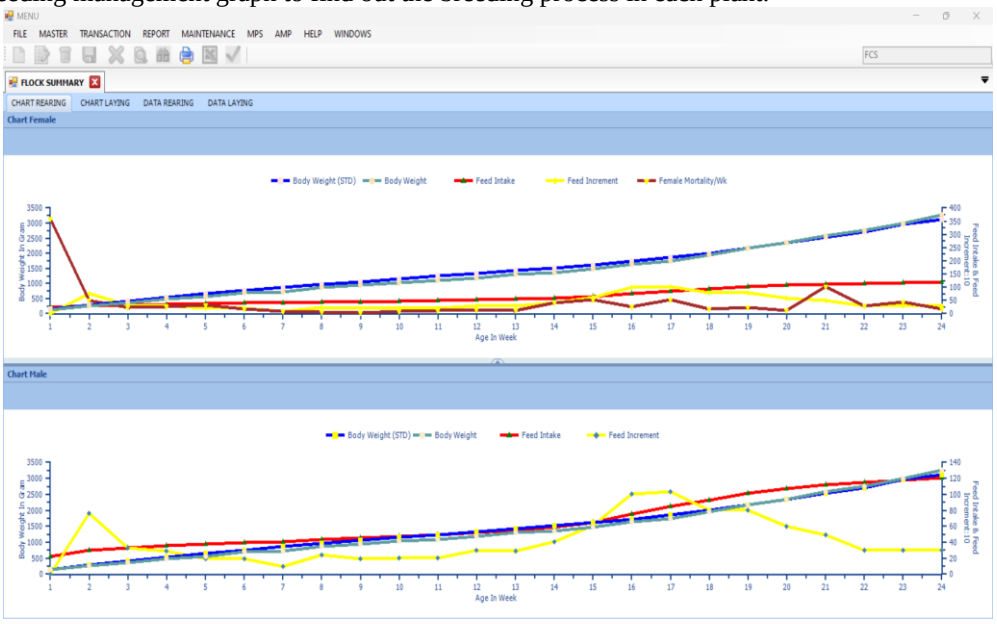

Fig. 10 Graphic Breeding Process

The graphical diagram above explains the breeding process per plant based on the COBB Management standard, which is an indicator of the livestock breeding process. With the flock summary, the breeding process can make decisions on what to do in the next breeding process.

IV. DISCUSSION

The result of this research is an information system that is useful for managing the production data of PT. Peternakan AyamManggis which will be used by company management in decision making. by using data collection methods and designing information systems with the waterfall method, the results of Analysis And Design Of Breeding Management Information System In Poultry Farms in the form of integrated and realtime reports and graphic flock summary which is useful for viewing the livestock breeding process of the system. the results of testing this information system run well must be tested. with blackbox testing as shown in the following table.

TABLE 1
BLACKBOX TESTING

NO	Testing Description	Test Case	Excepted Result	Result	Remark
1	Empty Login	Username and Password	User can not log in	the system will remain logged in displaying an empty username and password	Success
2	Wrong username or password	Username : namuser and Password : password	User can not log in	the system will remain logged in displaying an empty username and password	Success
3	user module authorization	1. Create Production 2. Create Pakan 3. Create Egg	user cannot enter another module or menu	displays the message "you do not have authorization"	Success
4	User authorization for data retrieval	Data retrieval according to user authorization	Data displayed in accordance with user authorization	system displays according to user authorization	Success
5	Entry Data with validation	numeric and character data entry	number only, character only, combination data entry	validation system required for data entry	Success
6	Entry Data with validation	Date Week Create Production	input the date every day, no skipping.	The system validates if the date input is later than the previous date that has been stored.	Success
7	Entry data with validation Empty Entry (Mandatory)	1. Plant 2. Unit 3. House 4. Location	cannot input further if the specified validation is not filled in.	the system displays a message if the input must be filled in	Success
8	Entry Data Value Stock Production	1. Stock Male 2. Stock Female	can't continue production next date	the system displays a message if the stock is insufficient	Success

V. CONCLUSIONS

From the discussion that has been presented, it can be concluded that the analysis and design of breeding management on this chicken farm is very much needed for PT Peternakan AyamManggis because this system can facilitate monitoring and managing production data and analyzing problems in breeding management. With this system, it can provide a quick solution in managing chicken farms and also provide the best solution. The process of production data, breeding calculations, report generation and presentation of information needed in decision making can be processed easily and quickly.

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